

## REMARKS

The Examiner is thanked for the thorough review of the present application.

Claims 17-18 and 21-28 are pending in the present application. Claims 17-18, 21-26 and 28 have been rejected under 35 USC 103 as being unpatentable over Deckard in view of Sachs et al. and Lewis et al. Additionally, claim 27 has been rejected under 35 USC 103 as being unpatentable over Deckard in view of Sachs et al., Lewis et al., and Loschau.

Applicants respectfully request reconsideration and allowance of the pending claims in view of the following remarks.

### Rejection of claims 17-18 and 21-28 under 35 USC 103

The Examiner rejected independent claim 17 under 35 USC 103 as being unpatentable over Deckard in view of Sachs et al. and Lewis et al. Independent claim 17 recites the step of preparing a powder bed having a first powder mix in a first region and a second powder mix in a second region, where the first and second powder mixes differ from each other in the chemical composition and/or powder particle size distribution. Additionally, independent claim 17 recites the step of forming a first/second region of the shaped object by a first/second laser sintering of the first/second powder mix, and that the respective first/second laser sintering is controlled to provide different material properties in the first and second regions of the shaped object. Additionally, independent claim 17 recites controlling a laser beam generated during the respective first/second laser sintering processes, to produce a different sintering temperature over the first and second regions of the object, creating a different degree of densification in the first and second regions of the shaped object. None of the Deckard, Sachs et al., or Lewis et al. references, alone or in combination, discloses these recitations, and accordingly, independent claim 17 is patentable.

In the Amendment filed on November 13, 2009, with regard to the rejection of independent claim 17, the Applicants argued that the suggested modification of Deckard, based on Sachs et al., would render Deckard unsatisfactory for its intended purpose, and thus the suggested modification could not be used to support the rejection of independent claim 17, per MPEP 2143.01. Specifically, the Applicants argued that Deckard discloses forming layers 54-57 of a powder 22 within a structure 28, based on an alignment of a laser 12 with associated optics,

and that Sachs et al. discloses layering two types of respective powders in respective regions, by alternately applying powder layers to each region through a dispersion head and a successive binder material between each respective powder layer. (November 13 Amendment, p. 5). The Applicants argued that, if Deckard was modified based on the teachings of Sachs et al., “for benefit of producing shaped objects with regions of different materials,” as suggested by the Examiner, this would necessarily involve moving the powder 22 from the structure 28 of Deckard into a dispersion head, where it would be successively applied to form layers, in between which a binder material would be applied, as taught in Sachs et al., and thus the laser 12 and optics disclosed in Deckard would be discarded and unneeded. (November 13 Amendment, p. 5-6). In the “Response to Arguments” section, the Examiner responded to this contention, and argued that “A fundamental concept of Deckard is the build up of a part in a layer-by-layer manner, and Deckard teaches a portion of powder 22 is deposited in the target area 26 and selectively sintered by the laser beam 64 to produce a sintered layer (col. 5, lines 55-67).” (Office Action, p. 11).

On the one hand, the Examiner has conceded that Deckard fails to disclose a first and second powder mix differing from each other in chemical composition or powder particle size distribution (Office Action, p. 3), and cited to Sachs et al. as providing this noted deficiency, namely, “the first and second powder mixes differing from each other in at least one of chemical composition and powder particle size distribution” (Office Action, p.3); on the other hand, the Examiner somehow rejects that the teaching of Sachs et al. implementing this modification (of layering the first and second powder mixes with the dispersion head and binder material) would even be implemented in the modified Deckard. Such inconsistent reasoning underscores the fundamental unsoundness of the Examiner’s reasoning. As previously argued, the suggested modification of Deckard requires that the powder 22 be repositioned in a dispersion head, and the layering of powder to be applied by successive applications of powder from the dispersion head and successive applications of binder material between the powder layers, as taught in Sachs et al. Indeed, the modified version of Deckard would render Deckard unsatisfactory for its intended purpose and would not involve the use of a laser sintering process, and thus the rejection of independent claim 17 is fatally deficient.

Additionally, in the “Response to Arguments” section, the Examiner argued that “Since Sachs et al. teaches that the first and second powders are individually applied from separate

dispersion heads, another dispersion head would be added for the second powder. Clearly, one of ordinary skill in the art would also, while depositing the first and second powders of a layer, move the dispersion heads in such a way so as not to interfere with the performance of the laser, optics, and thus the sintering process.” (Office Action, p. 11). Regarding the Examiner’s first statement, even if Deckard was modified, such that the powder 22 was positioned in a first dispersion head, and a second powder was positioned in a second dispersion head, this arrangement would nevertheless fail to disclose the claimed invention, as such an arrangement would merely involve: (1) successively applying a first and second powder layer into respective first and second regions, and (2) successively applying a binder material in between each successive powder layer in the first and second region, to form the layer structure and selectively vary the material properties of the first and second regions (col. 11, lines 15-25). Thus, even if Deckard was modified as suggested by the Examiner, and two dispersion heads were used, this arrangement would still render Deckard unsatisfactory for its intended purpose. Regarding the Examiner’s second statement, this statement mischaracterizes the Deckard and Sachs et al. references, as it presumes that one of ordinary skill in the art would somehow develop a method of: (1) applying a layer of first and second powder from a first and second dispersion head, and (2) use the laser 12 of Deckard in some fashion with these applied powder layers. Neither Deckard nor Sachs et al. teaches any such arrangement or method. As discussed above, the only layering method of powder involving the application of powder from the dispersion head also involves a successive application of a binder material in between the successive layers. Thus, there is insufficient teaching as to why one of ordinary skill in the art would unnecessarily use the laser 12 to form layers in the powder, when the dispersion head/binder material process has already formed layers.

In the November 13 Amendment, the Applicants pointed out that the Examiner conceded that neither Deckard or Sachs et al. disclose that the respective first/second laser sintering is controlled to provide different material properties in the first and second regions of the shaped object, as recited in independent claim 17, and cited to col. 4, lines 20-21 and col. 21 lines 14-22 of Lewis et al. to provide this noted deficiency (November 13 Amendment, p. 6). These portions of Lewis et al. merely disclose that one object of the invention is “to produce articles having variable density” and that density of an article may vary with laser power and/or a feed rate of powder which is melted by the laser (col. 21, lines 14-22). The Applicants emphasized that

Lewis et al. merely discloses a melting process, and thus teaches away from a sintering process, which is a method for making objects from powder by heating the powder to below its melting point until the particles adhere to each other (November 13 Amendment, p. 6). Thus, the Applicants argued that Lewis et al. fails to disclose that the respective first/second laser sintering is controlled to provide different material properties in the first and second regions of the shaped object, as recited in independent claim 17. In the “Response to Arguments” section, the Examiner contended that “Lewis et al. teach decreasing laser power results in less melting of the powder, thus reducing density (col. 22, lines 1-8). Therefore, it is inherent that powder particles not melted adhere to each other.” (Office Action, p. 12). As the Examiner is aware, “In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.’ Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original)” MPEP 2112. The Examiner merely pointed to a teaching of Lewis et al., which discloses that varying laser power causes less melting, which in-turn reduces density. This teaching provides no basis in fact or reasonable support for the Examiner’s inherency claim. Melting and sintering are distinct processes requiring very different environmental conditions. The fact that something does not melt is by no means a basis for assuming that it will sinter. Thus, the Examiner must provide a basis in fact or reasonable support for this inherency claim, per MPEP 2112, or the rejection will remain fatally deficient.

In the “Response to Arguments” section, the Examiner further contended that “Lewis et al. teach the forming of at least one of the first and second regions comprises controlling the respective laser sintering step to provide different material properties in the first and second regions of the shaped object” and cited to col. 4, lines 20-21 as disclosing “another object is to produce articles having variable density”; col. 22, lines 1-8 as disclosing “decreasing laser power results in less melting of the powder, thus reducing density”; and col. 21, lines 14-22 as disclosing “it is expected that smoother surfaces will be attained by use of powder of smaller size and by reducing the size of the powder spot.” (Office Action, p. 12). The Examiner continuously misrepresented Lewis et al., as it fails to disclose laser sintering, as discussed above, and these three cited portions above merely disclose producing articles with variable density, and reducing the power of a laser to vary density. Indeed, neither Lewis et al., nor any

cited prior art reference, alone or in combination, discloses that the respective first/second laser sintering is controlled to provide different material properties in the first and second regions of the shaped object, as recited in independent claim 17.


Accordingly, independent claim 17 is patentable. Its dependent claims, which recite yet further distinguishing features, are also patentable, and require no further discussion herein.

### Conclusion

Applicants respectfully request that the Examiner reconsider the rejections and timely pass the application to allowance. All correspondence should continue to be directed to our below-listed address. Please grant any extensions of time required to enter this paper. The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

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